COST *and* MANAGEMENT

THE OFFICIAL JOURNAL OF

THE CANADIAN SOCIETY OF

COST ACCOUNTANTS & INDUSTRIAL ENGINEERS

Telephone 2-0700

INCORPORATED 1920

HEADQUARTERS, 601-602 MACKAY BUILDING,

66 KING STREET EAST, HAMILTON

J. N. Allan, R.I.A., Secretary-Manager and Editor

Vol. XX NOVEMBER, 1946 No. 10

. . CONTENTS . .

Subscription price to non-members, $5 per year. Single copies 50 cents. Members desiring 5 copies or more of a single issue may obtain them at 25 cents each. Authorized as second class mail, Post Office Department, Ottawa.

• EDITORIAL •

As this is being written, the strike situation is beginning to clear and many men are returning to work. In reminiscing, quite a number of peculiar economic points of view have come to light. There are some good results but it would appear that the striking worker has had to pay a price for the support of the militant factions, along with the employers. There have been almost as many evidences of WRONG as there have been of RIGHT.

To any democratic man or woman the "closed shop" must appear to be a definite totalitarian encroachment on the democratic privilege of freedom of enterprise.

One of the achievements was increased wages of $90,000,000.00 for some 300,000 men and women in Canadian industry, per annum. What do these figures imply? No one is directly better off than the negotiating interests. Every other party has lost something. To those who have lost, it is a contingent question whether they can recover the loss during the next contract period. The possibility of the losers profiting is highly speculative.

It is contended that the increased wages will better the standard of living. No body has produced figures to prove this generally. Any improvement in the standard of living still depends entirely on the individual. The small percentage who do improve their standard of living would very probably have done so in any case without the extra money. MONEY in itself will never improve the standard of living. With the higher wages, the young men who are living in board and room statis, will be living the same and be as well dressed as they were before. In the case of home owners, in the labouring, unskilled class, it has in the past been amply proven even if they are placed in better housing with better food and clothes, they do not as a class rise above their established standard of citizenship. Only a small percentage of these show interest in improving their local community.

In one case the basic wage rate was established in Hamilton, Ontario to be applied to other provinces and in smaller communities. There is no mention of the cost of rents and food and clothing being raised to the city figure along with the wages. There is no apparent reason why the merchants in other points taking the stand that if the wages are based on Hamilton figures are in effect, city prices on the other commodities should be similarly raised in standard, should be criticized. What is good for the goose should be equally reasonable for the gander.

The law of supply and demand will eventually level off out of line prices. Artificial controls may defer the day of reckoning but the pay-off will come sooner or later,—if later it will be more drastic. There is no more definite proof of this than in the recent meat situation in the United States. The stock was held off the market for higher prices and there was also a political factor involved. As soon as the controls were removed there was a rush of stock to the markets for high prices. The supply exceeded the demand and the natural law of supply and demand came into consideration and prices have started to come down toward common standards. This is

the democratic method of doing business and so long as these principles prevail we shall continue to be a democratic country where one can enjoy the freedom of democracy.

Money and Wealth

If the people at large understood even the most elementary principles of the use of money and the source and determination of wealth, the economic cycles of the nation would be much closer to normal and the violent periods of inflation and depression would never occur.

Money is the most convenient and most expeditious means of doing business. When we lose the service of money and the respect of it, business comes to a stand-still and the means of trading resorts to bartering. When bartering gets into volume, practical trading is limited. Business volume can be increased through integrity expressed in promises recorded on paper and the most exchangeable form of paper is money. Coin is merely a further convenience provided to assist in the fluent transfer of commodities represented by paper, coin or MONEY.

Wealth is the reserve of transferable value in the possession of any person. It is the value of the money left over after sustaining one's self during the pay period. As this money reserve increases it may be placed into other forms such as bonds, land, houses, mortgages, any expressions of debt and even goodwill. The amount of reserve to which any person can claim title can be stated to be his wealth, as long as it is something that can be transferred.

The sense of values is more keenly appreciated by the merchandising people. Unfortunately, perhaps, due to our being traditionally in a land of plenty, the consumer has been trained to leave the estimation of values to the supplier and by and large does not question the value, of consumable items at least, except during depression periods.

As cost accountants, we, probably more than any other class, other than those engaged in banking business, have reason, as business people, to make closer appraisals of values. This is evidenced in the whole cost field.

The Society

We, as a profession, are trying to keep up with the changing economic conditions and the accompanying demands on our professional services. Through our branch meetings, we are endeavouring to keep our members informed on modern conditions and trends. The policies reflected in the topics covered by our speakers are most valuable to our membership at large. This is acknowledged quite frequently. During the last few years it has been reflected in increased membership. New Chapters are being brought into being. We have something to give our members in current accounting trends. Our officers are devoting much time to keep that condition progressive and competitive to similar fields in other countries. We have a student body in our membership and are providing courses in accounting and cost accounting designed to develop cost accountants of professional and executive stature. In this way, the Society is hoping to maintain a high professional standard.

At this time our Secretary-Manager is on his western Chapter tour. We hope the West will, in this contact, be helped and personally informed con-

cerning our progressive programs and the supporting contributions that can be made by the individual Chapters.

Our Society is literally an organiation for service. That service is essentially to business but there is no reason to believe that our profession lacks in the ability to serve government and public utilities under government operation. Our members are not in the class who are devoted to the accumulation of personal wealth.

G. M. Young (Sunday Times, January 14th, 1940), stated that: "People whose chief object in life is wealth are as a rule much less intelligent than people whose object is power, but, on the other hand, are far less disposed to do active wrong to those beneath them or about them. They may, from negligence or selfishness or mere thick-wittedness, do much harm—but it is harm of a kind which is largely controllable by public opinion, by legislation, by science."

New Members

Calgary Chapter

C. Vels, Insulation Industries (Alta.) Ltd.
Donald Taylor, Weber Bros. Agencies Ltd.
Miss Irene E. Lea, McDougall School
John H. Smyth, McColl Frontenac Oil Co. Ltd.

Edmonton Chapter

John O. Pietz, Northwester Utilities Ltd.
Gordon Crockroft, Dominion Income Tax
Miss G. E. Symington, Merrick Drug Co. Ltd.
Joseph Trickey, Northwestern Utilities Ltd.

Fort William-Port Arthur Chapter

Kenneth C. Burton, Hacquoil's, Fort William.
Wm. E. Brougham, Victoria Ave., Fort William.
Jas. Shanks, Jr., Central Trading Co. Ltd., Fort William.
Jas. M. Melville, Port Arthur "News Chronicle", Port Arthur.
Michael A. Kuzik, McNulty's Ltd., Port Arthur.

Hamilton Chapter

W. T. Dunmore, Canada Business College.
Jack Winn, Steel Co. of Canada.
David R. Wardrope, Brown-Boggs Foundry & Machine Co. Ltd.
Guy B. Curtis, Barnard Stamp & Stencil Ltd.
J. A. Hannon, Canadian Westinghouse Co. Ltd.
Thos. C. Lynch, Collins Never-Fail Products.
J. M. Dingwall, Hamilton Hydro Electric System.
Mrs. Beverly R. Freeman, Henry Birks and Sons Ltd.
E. J. McCarthy, International Harvester Co. of Canada Ltd.
Donald R. Murray, International Harvester Co. of Canada Ltd.
John E. Crickmore, Canadian Porcelain Co. Ltd.
Alex McMillan, Steel Co. of Canada Ltd.
Wm. W. Watson, International Harvester Co. of Canada Ltd.
Hugh F. Grightmire, Housing Enterprise Ltd.
Miss Elizabeth H. McMillan, Alexander Hardware Co. Ltd.
Frederick Moffatt, Steel Co. of Canada Ltd.
Robt. M. Graham, Donald Ropes and Wire Cloth Ltd.
E. C. Baker, Meakins & Sons Ltd.
H. B. Potticary, Meakins & Sons Ltd.
M. A. Capper, Meakins & Sons Ltd.
C. R. Field, Meakins & Sons Ltd.
Frank D. Grice, Meakins & Sons Ltd.
G. R. Smith, Wentworth Dry Ginger Ale Co. Ltd.
T. Earl Kett, Supertest Petroleum Corp. Ltd.
Gordon McNulty, Appleford Paper Products Ltd.
Cyril J. Mercer, Appleford Paper Products Ltd.
C. V. Sandwell, Appleford Paper Products Ltd.
K. C. Huffman, Steel Co. of Canada Ltd.

NEW MEMBERS

Kingston Chapter

A. E. Parr, Canadian Industries Ltd.
James T. Brownridge, Canadian Industries Ltd., Nylon Plant.
Wilfrid E. Cosgrove, Monarch Battery Co. Ltd.
J. Bruce Redden, Canadian Locomotive Co. Ltd.

Kitchener Chapter

Wm. H. Grauel, Dominion Tire & Rubber Co. Ltd.

Lethbridge Chapter

G. W. Shreeve, Lethbridge Collieries.
G F. Tallman, Meteorological Office.

London Chapter

Cyril G. Kensit, District Treasury Office.
Mervin J. Gardner, Imperial Oil Ltd., Sarnia.
J. H. Wallace, Gorman Eckert & Co. Ltd.
W. W.Plewes, General Steel Wares.
Hugh E. King, 20 Ridout St. S.
Richard S. James, Hygrade Corrugated Products.
Wm. T. Ashton, Lawson & Jones Ltd.
Miss Alice A. Clark, E. Leonard & Sons Ltd.
Thomas F. Stacey, E. Leonard & Sons Ltd.
Dudley M. Pegg, Sherlock Manning Pianos Ltd., Clinton.
J. Ross Moore, The Towland Construction Co. Ltd.
E. W. Lamb, 59 Hydro St.
Thos. P. Hartney, 59 Hydro St.

Niagara Chapter

Ed. R. Lewis, Davis Lumber Co., St. Catharines.

Toronto Chapter

Warren A. Brewer, Rogers Majestic Ltd.
J. Sidney Johnston, Philco Corporation of Canada Ltd.
B. H. Breckenridge, Campbell Soup Co., New Toronto.
Leslie Swaine, C.P.R. Telegraphs.
Basil J. Lloyd, 263 Sorauren Ave., Toronto.

Vancouver Chapter

F. G. Grimshaw, Dept. of Finance, Vancouver.
T. W. Cox, B.C. Packers Ltd., Vancouver.

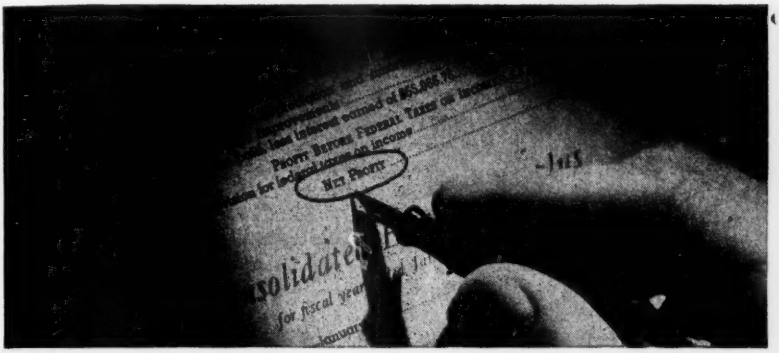
Windsor Chapter

Ernest R. Perkin, Purolater Products (Canada) Ltd.
Alfred Evans, Motor Products Corp.
Chas. E. Baxter, Motor Products Corp.

Non-Resident

Melville Goldenberg, Smith, Schacter & Gilman, Winnipeg, Man.

what are profits...



made of?

Profits are made of many things. Sound selling policy is one. Efficiency in buying is another. Service to customers is still another.

One of the most important of the many things which profits are made of is a factor which businessmen often overlook. That is the efficiency of the method used to handle transactions and keep records.

A smoothly functioning accounting department and satisfactory profits go hand-in-hand. That's why it pays to have a thorough check made of your methods of handling money and records. In this way you can be sure of full operational efficiency and lowest possible overhead.

Your local National representative will be glad to make such a check for you. He will study your methods of handling transactions and keeping records on the sales floor and then recommend the type of cash register system designed to help you gain maximum efficiency. He will demonstrate the cash registers that will help you speed service to customers and generally reduce your overhead.

In your bookkeeping operations . . . accounts receivable, accounts payable, sales audit, paybill desk, payroll . . . he will show you how the National accounting and bookkeeping machines will help you increase efficiency and keep better records.

It will pay you to get your National representative's recommendations on a new cash register now. It will help you build a bigger, more profitable business.

Call your local National representative or write The National Cash Register Company of Canada Limited. Head Office, Toronto. Sales Offices in principal cities.

National

CASH REGISTERS
ACCOUNTING-BOOKKEEPING MACHINES

Chapter Notes

BAY OF QUINTE CHAPTER

In the absence of the Chairman, Art Lockley, Past Chairman Les. Lennox handled the necessary business of our opening meeting in record time. Carl Casey, Chairman of the Student Instruction, announced that the first class would meet on October 22nd, at 7:30 p.m. in the sales room of Deacon Bros. Ltd.

Mr. Vuchnick, Controller of the Lincoln Electric Company, Toronto, was introduced by Ray Lennox. From the introduction it was learned that the speaker had served a number of years with the Lincoln Electric Company, at Johannesburg, South Africa. Mr. Vuchnick outlined the Wage Incentive Plan adopted in 1933 by the Lincoln Electric Company of Cleveland, Ohio. In six years the cost of their products decreased 60%; dividends to stock holders increased 40%. Further example, 110 man hours in 1933 to 19 man hours in 1939 for the same product. The workers have increased their wages by more than 200%. It would seem that this incentive plan is the answer to the Manufacturer's Economic Theory of "Better and Better Products for Less and Less Money."

The thanks and appreciation of the Chapter was expressed by I. Stephenson. A long discussion period followed. Mr. Vuchnick proved his outstanding ability by answering a number of questions. Programme Chairman Ray Lennox announced that the November meeting would be addressed by Mr. Ira S. Needles, R.I.A., Vice-President of the Goodrich Rubber Company, Toronto. His subject, "Sales and Cost," should not only be interesting, but instructive.

CALGARY CHAPTER

A special meeting of the Chapter was held at the Palliser Hotel on the evening of Thursday, October 24th, 1946, in honour of Mr. R. S. M. Ausman, president, and Mr. J. N. Allan, secretary-manager of the Dominion Society. A friendly get-together was arranged prior to the meeting in order that the Calgary membership could acquaint themselves with Mr. Ausman and renew their acquaintanceship with Mr. Allan, who visited Calgary last year with Mr. Furneaux.

After a hearty meal, Mr. Allan gave "A Challenge to the Industrial Accountant," which was followed by Mr. Ausman's address, "The Financial Budget as an Aid to Control of Commercial Business." Both speeches proved very interesting and educational, and the Calgary Chapter takes this opportunity to express their written thanks to these two gentlemen.

We were also privileged in having Mr. J. B. Whelihan, president of the Alberta Society in attendance at the meeting.

Later in the evening the Calgary Executive had the opportunity of discussing local problems with the Eastern visitors.

Our thanks also goes to "Pat" Bowsher for arranging a trip to Okotoks and the "Oil Fields" as a little diversion and entertainment for our visitors. Mr. Ausman lived in Okotoks district in his boyhood days.

Mr. T. R. Humphries, Chairman of the Calgary Chapter, presided both at the dinner meeting and the executive meeting held afterwards.

CHAPTER NOTES

OTTAWA CHAPTER

Forty members and guests attended our monthly dinner meeting on Thursday evening, October 17th, held on this occasion at the Tecumseh Golf Club, Gatineau Mills. Following the dinner, Mr. John Huberman, of International Plywood Limited, outlined the various processes in which logs are converted into plywood.

Although the plant, which is located nearby, had not been completely finished at that time, we were invited to visit it. This proved exceedingly interesting to all of us as was exemplified by the many questions asked and very capably answered.

At the conclusion of the tour Mr. G. S. Malloch thanked Mr. Huberman for being instrumental in making the evening such a success.

ST. MAURICE VALLEY CHAPTER

Sixty members and friends were present at the first meeting of the season held at the Cascade Inn. Mr. Henry Pike, the Chairman, spoke briefly on the Canadian Society in general and the St. Maurice Valley Chapter in particular. Mr. P. W. Wright then ably introduced the speaker, Mr. A. W. Gilmour, C.A., Special Assistant to the Inspector of Income Tax, who spoke on "Some Aspects of the Income Tax Legislation." The speaker drew our attention to the fact that numerous amendments have been made to the Income Tax laws and that the Income Tax Department welcomes court decisions, as the more we can get them the better laws we will have.

In closing, Mr. Gilmour stated that an Income Tax Office would be opened in Three Rivers as soon as available accommodations could be located. Dr. C. N. Crutchfield extended the thanks of the meeting to Mr. Gilmour for his interesting and informative talk.

VANCOUVER CHAPTER

The regular monthly meeting of the Vancouver Chapter, held in the York Room of the Hotel Georgia was fairly well attended. We had the pleasure of listening to an address by one of our members, Mr. R. C. Girling, R.I.A., of the Canadian Canners Limited, who spoke on fruit and vegetable canning costs. He outlined the evolution of canning in a very interesting manner, carrying us through to modern times and explaining the various government controls and subsidies. We all felt that Charles made an excellent presentation of a usually dry and lengthy subject in an exceptionally short time. A hearty vote of thanks was accorded the speaker and we think that the majority present felt they had gained something worth while from the talk.

Several new members from the New Westminster Chapter were present and also a very honored guest was Mr. H. S. Greenway, formerly of the Lethbridge Chapter.

Hearty congratulations were extended to member Peter Russell, M.C.I., R.I.A., when a wire was read out which stated that Peter had been granted the Honourary Degree of F.C.I. (Fellow Canadian Credit Institute.)

Richard C. Lucas, R.I.A., was in the chair.

VICTORIA CHAPTER

The Victoria Chapter held its first meeting of the autumn and winter season on Thursday, September 19th, 1946, in the Empress Hotel. As this was a business meeting only, the usual preliminary dinner was dispensed with. The attendance was only fourteen, a large number of our members being out of town.

The Chairman reminded the members of the coming visit of the Dominion President and the Secretary Manager from Eastern Canada on October 30th, and outlined arrangements made for their welcome.

An encouraging report was made to the effect that since the beginning of the fiscal year fourteen new members had been added to the Chapter membership, bringing the total to thirty-four.

Reports were received from the Chairmen of the Students' Study Group, and the By-Laws Committee, and from the Chapter delegate to the Provincial Council.

It was decided to postpone the October meeting until October 30th, in order to coincide with the visit of the Dominion President and the Secretary-Manager.

WINDSOR CHAPTER

The regular monthly meeting of the Windsor Chapter was held jointly with the London Chapter in the William Pitt Hotel, Chatham, Ont., on Thursday, October 17, 1946. There were 36 members of the Windsor Chapter, 25 members of the London Chapter and 30 guests present. The speaker of the evening was F. E. Wood, O.B.E., R.I.A., of the Cost Inspection and Audit Division of the Dominion Treasury Dept., Ottawa, who is also president of the Ontario Society of Industrial and Cost Accountants. Mr. Wood paid tribute to our Society and to Mr. Allen, our Secretary-Manager, for the part they are playing in training accountants for the future. Mr. Wood outlined how the cost accountant played such an important part during the war, not only in his department, but also in private industry, in presenting cost figures for government audit. Referring to the topic of his address, "The Post-War Field of Cost Accountants," Mr. Wood said that Canada has an intense future and the cost accountant who proved his worth so well during wartime has a future no less intense. The address was well delivered and much enjoyed and the speaker was warmly thanked on behalf of those present by Alan Cousins. The chairman of the meeting, Jack Copland, then made a few remarks regarding the possibility of the formation of a Chatham chapter of our Society and much interest was evidenced by those present from Chatham and Wallaceburg. Omer Cox, as chairman of our student advisory committee, then outlined our educational course and student activities.

The meeting adjourned at 9.35 p.m., after which an informal social meeting was held, which was much enjoyed.

Current Literature Digest

By HAROLD BRICKER, C.G.A., R.I.A.

Complacency in our business methods is, in these fast-moving modern trends, apt to let us sag into comparative inefficiency. An efficiency move has been initiated by the Australian banks in the matter of business forms. It is of interest to note the statement published in "The Chartered Accountant in Australia," under the heading of:

STANDARDIZATION OF CHEQUE FORMS

Cheques provided for customers, in future, will be standardized in many respects. The maximum size will be eight inches by three and one-half inches. The space for the insertion of the amount, in figures, will be placed on the right-hand side.

It is expected that the adoption of uniform and simplified methods will achieve a considerable saving, through handling economy, in clerical labour employed by the banks and commercial houses who deal with many thousands of these documents every day. This work has increased enormously during and since the war. Millions of cheques per year are now circulated and the great variety in size, shape and layout of the cheques now in use is responsible for slowing down the work and making it more difficult.

The re-designed cheques group the date, "bearer," figure amount and the signature on the right-hand side, thus enabling the four main essentials to be seen at a glance. The lines will in future be printed to standard spacing.

The banks are anxious that clients discontinue the practice, in printing their own forms, of embodying advertising matter on the face of the cheque, which often makes the reading of the essential details difficult. Advertising on cheques has been so developed that in some cases the whole background is filled with an elaborate picture, somewhat hiding the information shown. Much time must be spent in examination which retards handling and means only so much more time wasted. It is pointed out that, besides being expensive, the value as an advertising medium, of a cheque, is very doubtful. The only persons handling such documents are clerks to whom the advertising angle has no significance and little, if any, value.

The Objective

It is hoped that this streamlining and standardization will speed up this type of business. It is felt, however, that the adoption by all customers, as well as the banks, of the standard bill of exchange forms, will prove a substantial contribution toward the objective.

In these times, "lost motion," anywhere, is a LOSS.

The N.A.C.A. Bulletin recently published an article by Gilbert M. Fitzgerald, Houston, Texas, under the heading and subject of:

SENSIBLE WAGE INCENTIVES

Some interesting excerpts from this article include the following:

A survey concerning labour efficiency covering one thousand manufacturers reveals that 70 per cent. of the manufacturers have reason to believe that the effectiveness of labour, in their cases, is now less than during the pre-war years.

One of the principles of economics in American business has always been that the value of an hour's labour increases in proportion to the amount of production accomplished. This principle has operated for the executive as well as for labour. It is interesting to note that although we are operating with different economic systems, this principle has also been recognized in Russia.

Wages and Labour Productivity

To-day we witness tremendous pressures applied toward changing this basic concept of relating wages to production. Management is being urged to increase wages without a corresponding increase in production. The seriousness of this problem is brought out by the fantastic "studies" that received wide publicity and certain public acceptance. These studies supposedly proved that industry can substantially increase wages, that they can sell the production at prewar prices, and that industry will earn greater profits than they did in 1942. Although privately refuted by the more responsible labor leaders, they do indicate a dangerous trend in thinking.

Many of us remember the "efficiency experts" that followed the first world war. It took years to undo the damage done by these untrained, unqualified and sometimes openly dishonest persons. To-day's management should take grim WARNING that another such period is in the offing. Men who are qualified neither by education, by training, or by experience are setting themselves up as CONSULTANTS. Wherever these quacks have practised there have been production difficulties, employee discontent and strikes. Some plans were found discarded because they involved too much paper work or the rework and spoilage increased. In such cases it was not the principle of wage incentives, but the poor installation of the plan that caused the failure.

Wherever mystery surrounds an installation there will be trouble. The first step, a carefully written policy and procedure covering all phases of the plan is often overlooked. All members of the organization should be shown all there is to see about the plan. It is easy to understand why many executives, as well as staff, are confused or actually afraid of wage incentive plans. Of the more than twenty-five different plans, many are so complex that engineers themselves have difficulty in working with them. Is it any wonder that the uninitiated are frightened at such an array of slide rule gymnastics? What industry wants and can handle is a simple, understandable, and sensible wage incentive.

Types of Incentive Plans

Incentive systems do not come in cans. To try to use a set plan within any given industry is dangerous. All recently mentioned names with minor variations fall into the following five basic classes:

1—Measured day work. 2—Multiple time plans. 3—Halsey constant sharing

plan. 4—Rowan variable sharing plan. 5—100 per cent. time premium or piecework.

Only after it is determined that an incentive plan is needed, can the foundation for a sensible incentive plan begin.

Where conditions warrant, an incentive can usually be designed for any type of measurable effort. A properly designed and applied wage incentive plan is an effective management tool. It will not substitute for good supervision, rather it will supplement good supervision. It will offer some solutions to the problem of more money for less work, for it pays only on increased productivity. Sensible wage incentive plans carefully administered and understood by all concerned will aid management in holding its place in this competitive industrial world of to-day.

A REPORT ON OUR "RESEARCH" ACTIVITIES

We have brought before you in previous editions the question of setting up a RESEARCH department for our society. We are unable to report any production at this time. We can still state that the suggestion was favourably received. To get the department organized on a working basis, there appears to be either too little time available for the society, due to the demand of industry for personal effort, or it has been left to some one to take on the responsibility of leadership. As a society, we are TARDY and perhaps we are missing an opportunity in not getting an ACTIVE RESEARCH DEPARTMENT functioning.

Not only industry, but many societies who are modernly progressive, have already set up research committees who are producing new features for their particular interests and their members. The N.A.C.A. have a research group. The Internal Auditor reports the setting up of a research committee in their Institute in a recent edition of which the following paragraph suggests the procedure.

The resolution of the Board of Directors authorizing the Research Committee was adopted after several weeks of work in exploration of the idea of the Advisory Committee, the Chapter Activities Committee and the Director of Research, and after soliciting the views of the entire membership of the board, particularly Chapter Presidents, and after full discussion at a well-attended board meeting.

The Director of Research has been working out, with the advice and help of the Advisory Committee, the form of committee or sub-committee best adapted to carrying out the principal objectives.

The Management Review has published the information that The American Academy of Arts and Sciences announces that income from its Permanent Science Fund will be disbursed as grants-in-aid in support of research projects in the fields of Scientific Business Management Manufacture and Commerce, Engineering, Economics and Sociology, and other fields, or any other science of any nature or description.

It would therefore appear propitious to bring this question to the attention of our readers so that they may in turn discuss RESEARCH in the Chapter gatherings and with the members so that the officers may be given direction and support in this current supplementary activity of the Society.

Cost Accounting in a Rubber Industry

A Thesis by J. T. BONHAM

THE COST SYSTEM

The cost system used in the following outline is a Standard Cost System controlled by budgets and with a monthly distribution of variances, but before proceeding with an explanation of the cost system we must discuss briefly the procedure leading up to the manufacture of the products to be costed.

The factory manufactures to a certain daily "ticket" or schedule which is made up by the Merchandise Distribution Department and is based on an estimate of sales. A copy of the ticket (which is usually made up for a month in advance) is submitted to the Materials Estimating section of Production Control Department, who break it down into components, and, if it is found to be within the capacity of all departments, it is sent to the Plant Superintendent for final approval. If, for example, it is found that the amount of material required is beyond the capacity of the millroom, the ticket is returned for revision with a notation as to the amount of reduction necessary. This may be remedied by taking off some large sizes and substituting some smaller sizes of tires or tubes. When the ticket has been approved by the Plant Superintendent copies are sent to the following departments: Production Control (two copies, one for the Materials Estimating section and one for the Scheduling section); Planning, Specifications, Development and Technical Service, Factory Accounting and all processing departments concerned.

When Materials Estimating receive their copy of the approved ticket they estimate the quantities of all materials required, which information they supply to the Scheduling section, whose duty it is to schedule the material throughout the entire plant, so that there will be no bottlenecks and no loss of material at any point of manufacture. Proper scheduling is very important because rubber stocks are perishable with age. The schedulers must also order all production material from stores.

The Planning Department must see that all equipment, such as molds and tire building machines necessary to manufacture the products scheduled, are available and ready for use. In the case of new sizes, advance notice must be given to the Planning Department in order that they may have sufficient time to have new molds made.

When Specifications Department receive their copy of the ticket they must see that all sizes are covered by specification. If there are sizes on the ticket which have not been made for some time, it may be necessary to revise the existing specification. If there are sizes which have not been manufactured before it is necessary to make up new specifications. Copies of all revised and new specifications must be sent to all process departments concerned and to the Factory Accounting Department.

It is the duty of the Development and Technical Service Department to supply the Specifications Department with the information necessary to make up new specifications or to revise existing ones. In the case of new


ORDER MASTER
SHIPPING ORDER
ORIGINAL INVOICE
KEYSTONE CHROMIUM
BACK ORDER
SHIPPING ORDER
DUPLICATE INVOICE
KEYSTONE CHROMIUM
PACKING SLIP
SHIPPING TAG
ACCOUNTS RECEIVABLE
ACKNOWLEDGMENT
KEYSTONE CHROMIUM
DELIVERY RECEIPT
"DITTO Saves 50% CLERICAL TIME in shipping room"
KEYSTONE CHROMIUM CORP
One great feature of Ditto and Ditto Business Systems is simplicity! One writing, one typing, one paper original—no mats, no stencils, no special skills required—yet Ditto speedily makes all the copies needed for the most complicated Production, Purchasing, Payroll and Order-Billing routines! No other methods perform so efficiently. Ask us for proof. Let us show you how Ditto Business Systems get things done. No obligation, of course.
DITTO of Canada, Limited
185 Bay Street, Toronto, Ont., Canada
DITTO
ONE-WRITING BUSINESS SYSTEMS
Copies
RUN YOUR BUSINESS

sizes, they must receive advance notice in order that they may experiment and build trial products, if necessary.

The Cost section of Factory Accounting Department will see that Standard Costs are made up for all sizes on the ticket. They must also study specification revisions to see if any changes are necessary to existing Standards.

In the case of new sizes an estimated cost for quotation purposes will also be necessary, as well as the Standard cost for accounting purposes.

ELEMENTS OF COST

There are four elements entering into the cost of the product.

(1) **Material**—Only those materials entering into and becoming a component part of the product are considered material.

(2) **Labor**—Direct Labor operations which can be specifically allocated to the product enter into the cost as labor. All other labor is included as overhead.

(3) **Overhead**—Materials of a supply nature and indirect labor incidental to the manufacture of, but not capable of direct application to the product, also the cost of operating all staff and service departments will appear in the cost as overhead.

(4) **Waste**—This includes loss from defective product, loss from raw or partly processed stocks scrapped for any reason and the cost of repairing defective materials which can be made useable.

METHODS OF HANDLING

Material—In manufacturing a tire three major raw materials are used—rubber, fabric and pigments or chemicals. In the case of a tube, no fabric is used, but valve equipment is necessary. As may be seen from the departmental list, a separate storeroom is kept for each of these materials and in addition we have a Production Materials Storeroom in which is kept all miscellaneous production materials and supplies, and an Engineering storeroom in which is kept all supplies used exclusively by the Machine Shop. It is the duty of the stores departments to have available sufficient material to meet the daily manufacturing requirements. For this reason, all regular materials ar kept on a maximum minimum basis.

When the storekeeper wishes to order more material he will make out a Factory or "F" order in duplicate. The original copy is sent to the Purchasing Dept. and the carbon copy is filed. The Purchasing Dept. make up a purchase order in quadruplicate. The original copy is sent to the supplier, the second copy is sent to the storeroom ordering the goods, the third copy goes to the Accounting Dept., and the fourth copy to the Receiving Dept.

When the material is received, it is checked by the receiving clerk and a receiving slip is made up in triplicate. One copy is forwarded to the stores, the second is forwarded to the Accounting Dept. together with the copy of the purchase order, the third is filed. When the goods are received by the storeroom the stores clerk checks them with the receiving slip and if O.K. he stores them in the proper bins and forwards the receiving slip to the stores records clerk, who posts the quantities and the receiving slip number to his records.

After Accounts Payable have received and vouchered the invoices for goods received, they enter the invoice number and amount on a manifest, which is forwarded to Factory Accounting Dept. The Factory copies of the invoices are then sent to the chief stores clerk, who checks the invoices and forwards to the proper stores clerk, who checks the quantities against the receiving slip posting and enters the invoice number and the average cost. He then enters the account number on the invoice, initials it and forwards it to the Factory Accounting Dept.

Material can only be withdrawn from stores on a requisition properly signed by some person in authority. Different types of requisitions are used for different types of material. Items to be recovered as material in the costs are requisitioned on a "Material" requisition, stores of an expense nature such as tools, cotton waste, light bulbs, etc., are purchased on an "Expense" requisition. For material purchased by the engineering department for use on a job order an "Engineering Material" requisition is used. For rubber, fabric and pigments daily requisitions are made out for the entire day's requirements. Expense and engineering material requisitions are priced by stores at first in first out cost, ,but material requisitions are forwarded to the Factory Accounting Dept. unpriced, where they are summarized and priced at the end of the month at average cost for the month. If unused material is returned to stores or if material is transferred from one department to another the transaction is handled on a "Transfer" card. If stores material is to be scrapped because of obsolescence or breakage, an "Obsolete Material" requisition is used. This requisition must show the reason for scrapping and must be O.K.'d by the Plant Superintendent, the Manager of the Stores Dept., the Manager of the department for whom the material was originally purchased and the Manager of the Factory Accounting Dept.

After these requisitions have been posted to the stores records they are forwarded to the Factory Accounting Dept.

Periodic checks are made by each storeroom to see that the physical count agrees with the book record and an inventory is written up and forwarded to the Factory Accounting Dept. for check against their records. Different types of material are kept in different stores accounts, as will be outlined later. Stores Dept. will check some accounts each month, but all accounts must be checked at least twice a year exclusive of the complete stores inventory which will be taken at the end of the calendar year. If the check inventories show discrepancies between the actual count and the stores records a Stores Check report is made up in duplicate showing the date of check, the account number, the type of material, the actual count, the stores record quantity, the difference either over or short, the average cost and the extended value of the discrepancy. Stores Check reports must be approved by the Stores Dept. Manager before the records are adjusted. The original copies of these reports are forwarded to the Factory Accounting Dept. and the duplicates are filed by the Stores Dept.

Handling of requisitions by the Factory Accounting will be described in detail later.

In our discussion of stores we have included expense and engineering materials because the stores procedure is the same for these as for production materials. Expense and Engineering material are credited to stores and

debited to departmental expense accounts and job orders at actual cost, but production materials must go through several preparatory processes before they are ready to be used in the actual building of a tire or tube. The cost of each process is added to the material cost so that the final "material" cost includes preparatory labor and overhead.

Rubber and pigments when requisitioned from stores are charged at standard cost plus storeroom handling to the Compound Mixing Dept. In this department the ingredients are weighed out into batches according to the formula for the various compounds required. At this point a standard unit for Mixing Dept. Labor and Overhead is added. This unit is based on the estimated cost of operating Dept. mixing divided by the estimated weight of compounds.

The batches of pigments and rubber are then sent to the millroom to be milled into compounds. Each compound has a specified time for processing on the mill and this time multiplied by the estimated cost of operating the mill per minute gives us the standard cost of milling which must be added at this stage. The standard cost of the compound as it leaves the mill is the ingredient or dry cost calculated according to formula plus storeroom handling of ingredients, plus batching labor and overhead, plus milling labor and overhead. Some of these compounds are sent to the tubers to be run into treads and tubes, while others are sent to the calenders to b calendered on to fabric for use as plies in the tire. The fabric is charged to the Dept. Calenders at Standard Cost of green fabric plus shrinkage, plus storeroom handling. Compounds are charged to the Dept. Calenders at milled cost and the two are combined according to an estimated percentage to give us the standard cost of the rubberized fabric or treatment cost as it is known. To this treatment cost must be added the calendering labor and overhead. Some treatments take longer and cost more to calender than others, so different units are set up for groups of treatments based on past performance actual cost, which is arrived at by an analysis of Calendering Labor time sheets. As these treatments leave the Calenders they are in the final stage of preparation, but they are still in large rolls. These rolls then go to the biascutters, where they are cut into strips ready for the tire builders. At this stage they take on their identity by sizes and the cost of processing from this point on will show as labor and overhead in the costs. Similarily those compounds which went to the tubers leave the tubers as treads and tubes and are identified by sizes.

All standard costs are based on a study of past performance and expected changes. In the case of ingredient cost, the Purchasing Dept. are consulted to get the present market price and also any information which they might have of expected changes in market.

We are now in a position to be able to price the material used in the product.

Labor—From the point at which the various components take on identity by sizes, as mentioned above, to the final completion of the product, all direct labor will appear as "Labor" in the costs. But in dealing with labor we must also consider indirect labor, which will appear in the costs as overhead.

Direct labor covers operations which can be charged directly against the product and is charged to departmental labor in the process ledger.

Most direct labor is done on piece work. The piece work rate can be used as a base for the standard cost, but to this must be added a leeway to cover overtime, learner's allowances, bonuses, etc. This leeway is established by a study of past performance, making allowance for any expected changes in production or policy. In the case of day work, a time study must be made, and the time for the operation multiplied by the operator s rate will give a fairly accurate basis for the standard cost. After a standard rate has been set for each operation in the assembling and building of the product, the labor cost of the product can be calculated. For this purpose a labor cost sheet is kept, which is auxiliary to the product cost sheet.

Indirect labor covers operations which are incidental to but not directly applicable to the manufacturing of the product, such as supervision, chemical and general upkeep jobs. Indirect labor also covers labor operations in staff and service departments auxiliary to but not directly engaged in production. Indirect labor is charged to departmental expense accounts. For the purpose of accounting and statistical control, indirect labor is further classified into accounts according to functions.

All labor rates are set by the time study section of the Efficiency Department, but the calculation, payment of and accounting for wages is a function of the Factory Accounting Dept. and is under control of the Paymaster, who is directly responsible to the Manager of the Factory Accounting Dept.

The duties of the Payroll and Timekeeping section are divided into three functions: (1)—Timekeeping. (2)—Payroll. (3)—Labor Distribution.

The duties of the timekeepers are to calculate and verify all wages earned by factory employees who are paid on a basis other than salary, to report such earnings for each employee to the payroll section for recording and wage payment and to report earnings to the labor distribution section in such a way that they may be readily segregated into the operation and account classification required.

Rate sheets are issued for each department by the time study department, copies of which are sent to the department to which the rates apply, the cost, the timekeeping and the labor distribution sections of the Factory Accounting Dept. Piece work rates are established only after sufficient time studies have been made. Rates are serially numbered for each department and the rate sheets must show this number, a description of the operation and the rate. Records of rates in effect must be kept up to date at all times. Day work rates may be set for individuals or for operations. If the rate is per individual, it is established by an employee's rate card, received from the Personnel Dept. If the rate is for operation a rate is put on the rate sheet and is given a number.

Piece work rates and day work rates are given a distinctive series of numbers so that the operation number will tell whether it is day work or piece work.

Time sheets are made up either by the employee himself or by a supervisor or clerk. In either case it must bear the supervisor's or the Foreman's signature. Time sheets must show the employee's name, clock card number, department, operation number, rate and the units produced or the number of hours worked. If there is a clerk in the department the time may be extended and the total wages shown.

The timekeeper must see that all rates are correct, that correct number of hours or number of pieces are reported, that the extension is made correctly, that proper bonuses or allowances are paid and that proper authorization has been obtained to pay these bonuses and allowances. He must check the employee's time sheet with his clock card to see that the correct number of hours are reported. After the timekeepers are satisfied that all wages earned are correctly reported and calculated, they must report the total earnings of each individual for the pay period to the Payroll section in such a manner that they be entered on the payroll records without further accumulation. If the time is reported on a weekly sheet this will suffice, but if time is reported on a daily sheet these must be accumulated. Space is provided on the clock card for total earnings and when the check is made between the time sheets and the clock cards (which is usually done after all calculations have been made), the total earnings are transferred to the clock card. This allows the detailed time sheet to be turned over to the Labor Distribution at the same time as the clock cards are turned over to the Payroll section.

The Payroll section will record the wages due to employees (other than salaried employees) and will deduct any amounts required to be withheld for taxes, etc., and will make payment to the employee of the net balance. On a form the employee's clock card number, name, number of hours and gross earnings are posted from information supplied by the Timekeeping section, the balance is computed by the Payroll section. When a certain deduction is used frequently a column is provided for it, but if a deduction is only made occasionally it is given a code and entered in the miscellaneous column.

Since wages are paid in cash, an analysis of each individual payment must be made in order that money in the proper denominations may be secured from the bank. This is done on a change sheet, a copy of which is attached. A change sheet is made up for each department and then a summary is made of departments to arrive at total required. This is done so that the work of filling the envelopes may be divided up.

An envelope and coupon is made out for each employee as per attached sample. The envelope shows employee's clock card number, dept. and name and the net amount due. The stub or coupon shows the clock card number, Dept., name, gross earnings, detail of deductions, net amount due, and a space is provided for employee's signature. When the envelopes have been proven with the payroll record, the coupons are detached and delivered to the department foremen, who distribute them to the respective employees. The detail on the coupon enables the employee to check the calculation of net wages. This coupon is signed by the employee and is given to the pay clerk when wages are received.

The Labor Distribution must analyze and summarize gross earnings in the manner required by the Cost Dept. for costing and statistical purposes.

For Production Departments a complete breakdown of Direct Labor and Indirect Labor by operations is required, showing the number of hours. Bonuses and allowances must be shown separately.

For Staff and Service Departments the breakdown necessary is by account number as shown for Indirect Labor at the beginning of the chapter on Labor.

Since Payroll is made up weekly, Labor Distribution will summarize weekly in order to tie in with total wages as shown by the Payroll.

Labor Distribution makes up the "wage" voucher which charges the labor to the proper process and expense accounts in the factory ledger.

Labor is recovered at standard rate multiplied by total production. The difference between actual labor and standard recovery is, of course, a variance. Labor variance will be discussed along with other variances later.

OVERHEAD

The two elements of cost already discussed are uncontrollable to the extent that a definite amount of material is required and a definite amount of labor is necessary to manufacture the product and the cost of both material and labor depends on the market. Some overhead, such as depreciation, taxes, etc., is also uncontrollable, but a great deal of it is controllable and much can be accomplished by careful study of overhead costs and by strict adherence to the budget to keep costs low. Much can also be accomplished by making and keeping the departmental foremen "cost conscious." This requires a great many reports and much detailed information must be accumulated. This will be further discussed under the heading of "Expense Ledger."

From these reports and information accumulated forecasted rates are established for the standard costs. There are several methods of recovering overheads. Storeroom overheads for rubber, pigments and fabric are based on pounds handled by the storeroom. Millroom and other preparatory and most production department overheads are recovered as a percentage of direct labor. In the cure, number of heater hours is used as a base and overhead per unit of product is calculated on the time of cure which is specified for each product. Development expense and mold expense are both recovered on production as a cost per unit of production. Mold expense can be calculated for each different size, since mold expense consists of depreciation and maintenance charges on molds. Depreciation or amortization of mold cost is split over the estimated production to be cured in the mold over an estimated life of the mold. The order for maintenance work will show the mold size so that this con be split to individual sizes. Thus we have a different mold unit for each size of tire or tube. Development expense can not be applied directly to sizes, so that we will have one unit for all sizes. Of course, tire and tube development expenses will be segregated.

Since there are so many different bases for distributing overhead, a supplementary cost record is made up showing the accumulation of all items of overhead for each size. From this supplementary record the total unit of overhead is carried to the cost sheet.

WASTE

This element of cost is one which must be watched very closely. If uncontrolled it can easily wipe out a great deal of profit. Waste can be classed as defective and natural waste. Defective waste is that caused by poor workmanship or defective material. This waste can be avoided or at least cut to a minimum. Natural waste is waste material such as ends of rolls which are too short to be used or selvedge edge of fabric rolls which

cannot be used. Complete detailed records of all waste must be kept and sufficient reports issued to the management and to the foremen to keep them conversant with the waste loss.

Waste loss from defective material will be negligible if all raw material is tested and approved by the laboratory before it is released into production. Defective waste caused by poor workmanship is the responsibility of the department foreman and he must be held accountable for it. Much can be accomplished in the matter of waste reduction by making all employees waste conscious. This can be achieved by weekly or daily reports to those concerned, showing loss in dollars and cents caused by their department, and also by the use of charts showing graphically the increases and decreases in the amount of waste.

In order to be able to issue reports and to correctly compute the waste loss for control and also for cost purposes, it is necessary to have a very thorough accounting procedure for waste. Proper containers must be kept in each department for each kind of waste and all waste must be deposited in these containers. This waste is collected daily or possibly each shift (thus replacing responsibility on the proper shift) by the scrap collecting department, who will sort and examine all scrap. If any of the scrap can be treated and used this is sent to the stock treating section of the Scrap Department, where it is made useable. The cost of this treating must, of course, be charged to Waste. If the scrap cannot be used a scrap tag is made up showing the Department from which the scrap is collected, the type of material, the reason for scrapping and the weight. The scrap is then disposed of, either by destroying or by sending to the Salvage Department to be sold as scrap. Any scrap value will serve as a reduction to Waste Loss. At the end of each day the scrap tags are forwarded to the Cost Department, who sort them by departments, types or scrap and causes. These scrap weights are totalled at the end of each week and a report is issued to the management showing the percentage of waste loss to net deliveries of stock by causes. The weight of scrap is posted by the Cost Department to a permanent record, which, at the end of each month, is priced and the total waste loss calculated. This waste is charged to the proper Department Waste Account in the factory ledger and is credited to the Material Account. In the case of defective finished product the procedure for handling will be slightly different. If the final inspection reject a tire or tube a rejection tag is placed on it. This product must then be re-examined by a committee set up for this purpose. This committee will have at least one member from the technical service staff. They may decide that the product, with some very minor repair, may be put into stock as a first-class product, or if a larger repair it may be put into stock as a second, or it may be scrapped entirely, in which case it is then destroyed.

For cost purposes the Cost Department will segregate waste into "Preparatory Waste" and "Defective Product." Preparatory Waste is included in our final standard material cost in the same manner as preparatory labor and overhead. "Defective Product" waste is distributed back to costs as a percentage of production value. In setting the standard for defective waste a study will be made of past performance. If this past performance has not been satisfactory it is well to set a standard somewhat lower and then bring pressure to bear on the department foremen to bring their defective product

in line with the standard set. Defective waste will be the last item on the cost sheet, since it is figured on all costs up to this point, including material, labor and overhead.

FACTORY ACCOUNTING

Under this heading we will discuss the method by which the four elements of cost outlined above are accounted for in the factory ledger.

As mentioned before, the factory ledger is controlled by "Factory Account" in Head Office ledger. All postings are made to the factory ledger from a set of journal vouchers which are grouped and numbered according to functions. All debits and credits to Head Office from these journal vouchers will be supplied to them on journal sheets at the end of the month.

The factory ledger is divided into six subsidiary ledgers.

(1) General Ledger—This ledger contains the control account of each of the other five ledgers and is itself controlled by Factory Account in the head office ledger. Postings are made to this ledger from the control totals as shown by the voucher register.

(2) Process Ledger—This ledger contains all Material, Labor and Waste Accounts, and Finished Stock Variance Account. Postings to this ledger are made from the detail on the journal vouchers and consist of all debits or credits for material, direct labor and waste.

(3) Stores Ledger—An account is kept in this ledger for each type of material and the accounts are serially numbered with a different series allotted to each storeroom. For example, numbers from 1 to 19 are reserved for Dept. 21-B., Engineering Material Storeroom, numbers from 20 to 29 are for production and supply materials stored in Dept. 21-A., Production Material Storeroom. These accounts are debited with goods purchased and credited with goods requisitioned, as shown by the journal vouchers. These accounts in reality are control accounts for the Stores Records, which are kept in detail by the Stores Record Clerk, as outlined above under heading of "Material."

(4) Miscellaneous Ledger—As the name implies, this ledger carries accounts, which, by reason of their nature, do not belong in the other ledgers, such as Engineering Material, Labor and Overhead accounts, Storm and Flood Account, and so on.

(5) Actual Expense Ledger—This ledger contains an account for every department in the plant. The expense ledger sheet is designed to serve as a statistical record, as well as a ledger sheet. Expenses are divided into two major classifications "created and apportioned."

Created expenses are shown at the top of the ledger sheet and are further divided into the following sub-groups:

(1)—Indirect Labor
(2)—Operating Items
(3)—General Charges
(4)—Fixed Charges
(5)—Maintenance

Apportioned Expenses are shown at bottom of the ledger sheet, and are composed of all expenses distributed from staff and service departments.

As may be seen by the form of "Expense Ledger Sheet," detail of

Indirect Labor and Maintenance are not shown. This information is given to the department foreman on supplemental sheets.

Columns are provided for six months on each sheet. At end of each month's closing copies are made of each departmental expense sheets, and are given to department foremen for their consideration.

Expense Recovery Ledger—This ledger contains an account for each production department. The difference between the Expense Recovery account in this ledger and the corresponding Actual Expense account in the Actual Expense Ledger, represents the Overhead Variance.

JOURNAL VOUCHERS

The following is a list of the journal vouchers with an explanation of each:

(1) Depreciation—The purpose of this voucher is to debit departmental expense accounts and to credit Reserve for Property Investments (Head Office Ledger) with the depreciation set up on buildings and equipment. Detail for this is supplied by the Property Account Ledgerkeeper.

(2) Mold Depreciation—To debit departmental expense and to credit Reserve for Property Investments with depreciation on molds. Standard mold recovery units are set up for each size based on the expected output of the mold during its estimated life. This standard unit multiplied by the production for the month gives the amount to be set up as depreciation or amortization. This is compiled by the Cost Department.

(3) Taxes and Insurance—To debit expense and to credit Prepaid Taxes and Prepaid Insurance with the monthly portion of taxes and insurance. The amount of taxes and insurance to be written off is supplied by Head Office Accounting Department. Taxes and insurance on the buildings charged to Building Expense, and insurance on equipment is charged to departments on a basis of value of equipment.

(4) Property Transfers and Adjustments—To debit Reserve for Property Investments and to credit Property Investments with machinery or equipment removed from Property Accounts. When a piece of equipment is scrapped or otherwise disposed of through breakage or obsolescence, a property transfer card is made up in duplicate. The original copy goes to the Property division of Head Office Accounting. This copy serves as a follow-up. When the equipment has been received by the Salvage Department, the original copy of the transfer is forwarded to the Property division, who enter the value of the equipment and the amount of reserve set up, post the transfer to their records, and forward the transfer to the Cost Department. Any unrecovered balance is charged to Departmental Expense.

(5) Reserve for Vacations and Holiday Pay—To Debit Management Policy expense and to credit Reserve for Vacations and Holiday Pay (Head Office Ledger) with the monthly portion of the estimated cost of vacations and payment of legal holidays. When payment is made for vacations or holidays the reserve account is charged. The final month's set-up is adjusted to make the Reserve balance with the actual amount paid.

6-A Reserve for Pensions and Compensation—To debit Management Policy expense and to credit Reserve for Pension and Compensation (Head Office Ledger) with the monthly portion of the estimated cost of pensions

and compensation. Payments for pensions or compensation are debited to the Reserve account.

6-B Reserve for Unemployment Insurance—To debit departmental expense accounts and to credit Reserve for Unemployment Insurance (Head Office Ledger) with the amount of unemployment insurance to be paid by the company. This voucher can be combined with the preceding one.

(7) Deliveries to Finished Stock — To debit Finished Stock (Head Office) and to credit the proper factory accounts with the standard cost of all products completed and delivered during the month. Production to be charged to Finished Stock is summarized on a form showing the size, type, quantity produced, unit cost (Standard) extension (debit to Finished Stock) and a breakdown of the standard recoveries by Material, Labor, Overhead (and Waste). When completed, these summary sheets are recapped to the voucher and are forwarded to Sales Statistical division of Head Office Accounting Department.

(8) **Variances to Finished Stock**—To debit or credit Finished stock with the variances between actual cost and standard recoveries with the offsetting debit or credit going to Finished Stock Variance account.

(9) **Withdrawals From Finished Stock**—To debit departmental expense accounts and to credit Finished Stock with the value of products withdrawn from Finished Stock to be used for testing or other departmental use.

(10) **Royalties Paid**—To debit departmental expense accounts and to credit Royalties Payable (Head Office) with royalties payable.

(11) **Debits and Credits From Head Office**—To debit and credit the proper factory accounts with all goods and services purchased for the factory, and with all factory billings and cash sales. The offsetting debits and credits go to Head Office. It may be found advisable to divide this voucher, for example, all invoices could be summarized on voucher 11-A., all miscellaneous adjustments on V.11-B., and all factory billings and cash sales on V-11-C.

As stated before, Head Office must give complete detail of all charges to Factory Account. For goods received, copies of all suppliers' invoices are given to the Factory Accounting Department. For services rendered and for miscellaneous adjustments, a journal entry is made by Head Office, and a copy is given to Factory Accounting. Factory billings and cash sales originate in the factory. In the case of billings, the department selling or returning the goods makes up a request for billing, which is forwarded to the Invoicing Department, who make out a billing in triplicate. The first copy goes to the customer, the second and third copy go to the shipping room with the goods. When the goods have been shipped the second copy is sent to the Head Office Accounting Department, for posting to Accounts Receivable, and for summarizing. At the end of the month the summary of billings is forwarded to the Factory Accounting Department. Cash sales are issued by the cashier's department, and the detail of credits is given to the Factory Accounting Department.

When invoices are received by the Factory Accounting from the Stores Department, they are keyed off on the invoice register (manifest), sorted by account number, added and summarized on the voucher.

When journal entries or miscellaneous adjustments are received, they

are posted to summary sheet, by accounts. At the end of the month these summaries are added and vouchered.

(12) Returned Goods Repairs—To debit Head Office and to credit factory accounts with the cost of repairing and reconditioning products returned from branches or warehouses.

Stores Vouchers:

20—Stores Withdrawals—Rubber
21— " " Fabric
22— " " Pigments and Chemicals
23— " " Miscellaneous Material

The above stores withdrawal vouchers are used to debit process, and to credit stores accounts with all production material requisitioned from stores during the month. The vouchers are compiled from the daily requisitions for rubber, fabric and pigments, and from the materials charged into process at standard and are credited to stores at actual cost, with the variance going to Finished Stock Variance account.

(24) Stores Withdrawals—Expense—To debit departmental expense accounts and to credit stores accounts with all supplies of an expense nature, as shown by a recapitulation of all expense requisitions.

(25) Stores Withdrawals—Engineering Material—To debit Engineering Material and to credit stores accounts with all material requisitioned from stores for use on engineering job orders. This is a recapitulation of engineering material requisitions.

(26) Stores Withdrawal—Fuel—To debit Department 16-A. Actual Expense, and to credit Stores Account 65 with the value of fuel consumed during the month. Coal is brought in by truck and is dumped into the hoppers, so that the amount consumed is the amount purchased. One requisition is put through for the entire month's consumption.

(27) Stores Withdrawals—Obsolete—To debit departmental expense accounts and to credit stores accounts with all stores material scrapped, through obsolescence or breakage.

(28) Stores Adjustments—To journalize all adjustments of errors in stores accounts, and all inventory adjustments, as shown by the stores check reports.

Labor Vouchers:

(31) Wages—To debit manufacturing process accounts with direct labor and departmental expense accounts with indirect labor, and to credit Wages Payable with the monthly payroll, as shown by the labor distribution. This voucher is compiled by the Labor Distribution section.

(32) Charge Labor—Occasionally work is done in one department for another. For statistical purposes it is desirable that this labor should show in the department performing the work, but for accounting purposes it must be charged against the department which benefits from its performance. The purpose of this voucher is to debit the latter department, and to credit the former. When work is done by one department for another, a notation must be made on the time sheet. This voucher is also compiled by the Labor Distribution section.

Waste Vouchers:

(40) **Defective Waste**—To debit waste accounts, and to credit labor and material accounts with the value of all products rejected by the Final

Inspection as unfit to be delivered to Finished Stock, also with the value of all partly processed material, which is scrapped due to poor workmanship or defective material. This voucher is compiled from the scrap tags received from the Scrap Collecting Department.

(41) Waste, Other Than Defective—To debit waste accounts, and to credit material accounts with the value of all raw or partly processed material scrapped from natural causes, such as roll ends, etc. This is kept separate from defective scrap because this type of waste is largely uncontrollable.

(42) Product Repairs—To debit waste accounts and to credit the proper labor, material and expense recovery accounts with all labor and material used in repairing products which are defective, but which require only a minor repair, to be made saleable.

(43) Customers' Repairs—To debit waste accounts or Accounts receivable, and to credit the proper labor, material and expense recovery accounts for the cost of repairing tires returned from customers because of defects. When products are returned from customers, they are thoroughly examined by the Returned Goods Department (Head Office), and are classified as follows: **(1)**—defects due to faulty manufacture **(2)**—defects due to some fault of the customer, such as under inflation. The first type of defect is charged to waste, and the second type is charged to the customer.

Processing Vouchers:

(50) Compounds Put Up—To debit Dept. 32 Material Account, and to credit Dept. 31 labor, Material and Expense Recovered Accounts, with all batches of compounds put up during the month. A requisition is made up by the millroom scheduler, for the stocks required for each day's production. This requisition shows the compound code number, the number of batches required, the weight per batch, and the total weight. Dept. 31 Compound Mixing weigh up the batches according to formula, and deliver them to the mills. The daily requisitions are forwarded to the Cost Department, where they are summarized and totalled for the month. These weights are priced and extended at standard batch cost, which is the cost of ingredients, plus the standard units for Dept. 31 Labor and Overhead.

(51) Milled Compounds Delivered—To debit Dept. 33 Material with with all compounds delivered to the calenders, to debit Dept. 44 Material, Dept. 51 Material, and Dept. 56 Material, with all stocks delivered to the tubers for use in airbags, tires and tubes, respectively, and to credit Dept. 32 Material, Labor and Expense Recovered, with all stocks milled during the month. The weights used for this voucher are compiled from milled compound delivery tags made up by the millroom, and showing the compound number, the weight, and the department to which it was delivered. The cost used for pricing these stocks is the standard milled cost (batch cost, plus the standard milling labor and overhead).

(52) Calendered Compounds Delivered—To debit Dept. 51 Material, and Dept. 56 Material Accounts, and to Credit Dept. 33 Material, Labor and Expense Recovered with all calendered compounds delivered to production departments, for use as gum strips, etc. These weights are compiled from calendered compound delivery tags, and are priced at standard calendered cost (milled cost, plus calendering labor and overhead).

(53) Calendered Fabric Delivered—To debit Dept. 51 Material and to

credit Dept. 133 Material, Labor, and Expense Recovered, with all calendered fabric treatments delivered during the month. The delivery tags from which this voucher is compiled show the fabric and compound code numbers, the weight of fabric and the weight of compounds. These weights are summarized and the fabric is priced at standard dry fabric cost, and compounds are priced at calendered cost.

(55) Cements Used—To debit process accounts and to credit Dept. 34 Material, Labor and Expense Recovered with all rubber cements used in production. There will be some cements used for repairs, and some as expense material, in which case the debit will go to waste and departmental expense respectively.

(56) Airbag Production and Repairs—To debit Airbag Expense Account, and to credit Dept. 44 Material, Labor and Expense Recovered with the cost of all new airbags produced, and the cost of repairing bags already in use. Every tire must have an airbag in it to keep it from collapsing during cure. Airbag expense is recovered in the costs on a basis of the estimated cost and the estimated number of cures per bag.

Miscellaneous Vouchers:

(60) Inter Dept. Orders—When one production department wants work done by another production department, other than regular production work, an inter-dept. order is issued by the department wishing the work to be done to the department which is to do the work. When the job has been completed, the department performing the work show on the I.D.O. the amount of labor and material used, and send the I.D.O. to the Cost Department, who complete the cost by adding overhead. At the end of the month these I.D.O.'s are summarized on this voucher and the proper accounts are debited and credited.

(61) Transfers—When material is transferred from one department to another, or when material is returned to stores, a transfer card is made out by the department disposing of the goods. This transfer card must be signed by someone in authority in the department receiving the goods, after which it is forwarded to the Cost Department, who enter it on the transfer voucher, debiting the department or account receiving the goods, and crediting the department or account disposing of the goods.

(62) Cost Variances—To debit Finished Stock Variance with all losses and credit Finished Stock Variances with all gains from variances, other than purchasing variances which are handled in the Stores Withdrawal voucher. This will be further discussed under the heading of variances.

(63) By-Product Sales—Profit from sale of by-products (Selling Price, less cost of handling) is calculated on this voucher. By-Products are chiefly scrap material, and any profit realized from the sale of such is credited to the waste account of the production department from which the scrap is received. The entry for this will be a debit to (Head Office)—(Acct's. Receivable), for the full selling value of by-products, and a credit to Department 85 Labor and Overhead, for the cost of handling or salvaging the material, and a credit to Manufacturing Waste for the difference.

(64) Adjustments, other than Stores and Inventory—The name of this voucher is self-explanatory.

(65) Inventory Adjustments—At inventory all differences between actual inventories and book balances will be written off to Head Office Account

on this voucher. This voucher is not a monthly voucher, but is used only at inventory time.

Engineering Vouchers:

(80) Property Charges From New Work—To debit Property Investments with the cost of all new equipment manufactured by our own machine shop. The offsetting credit is to Dept. 10 Labor, Overhead, Material and Sales Tax accounts.

(81) Maintenance—To debit departmental expense accounts with the cost of all jobs of a repair or maintenance nature. The offsetting credit goes to Dept. 10 Labor, Overhead and Material Accounts.

(82) New Work, Other Than Property—This voucher covers all jobs done by the machine shop, not covered by the two preceding vouchers. For example, the machine shop make some wooden boxes for the shipment of goods, also some items such as small tools, which are carried as stock in the Engineering Material Storeroom. The proper accounts are debited, and as above, the credit goes to Dept. 110 Labor, Overhead and Material, and, if applicable, Sales Tax accounts.

Expense Distribution Vouchers:

(90) Service—The cost of operating Dept. 5-A—Janitors, Dept. 75—Inside Trucking, Dept. 76—Outside Trucking, Dept. 86-A—Materials Estimating, and 86-B.—Production Control, are distributed to other departmental expense accounts on this voucher. The basis for distributions is as follows:

Dept. 5-A. Janitors—The daily time card for each janitor shows the time spent in each department. A report is made up by the labor distribution department showing the accumulated labor spent in each department during the month, and the total cost of operating the Janitor's Department is distributed on the basis of this report.

Dept. 75—Inside Trucking—Trucking within the plant for all departments is done by Dept. 75. An analysis is made of the time spent in trucking for each department in one day, and this is used as a basis of distribution. This percentage distribution must be watched very closely, because a change in production ratio of products will greatly affect it.

Dept. 76—Outside Trucking—A fleet of trucks are maintained to do trucking, both of outgoing and incoming materials. Each truck driver submits a daily report showing the time spent, the weight of material trucked, the department for whom the trucking was done, whether incoming or outgoing material, and the destination for each trip. Zones have been set up, according to distance from the plant, and a base rate per hundred pounds has been set up for trucking, to or from these zones. A recapitulation is made of truckers' daily reports by zones, showing the weight trucked, and the department for whom the trucking was done. These weights are then extended at base rates, and if total is greater or less than the cost of operating the department, the rates are scaled up or down, whichever is necessary, and the departmental charges can then be calculated at the new rates, thus established.

Dept. 86-A. Materials Estimating—An analysis is made of time spent by estimators for each department for a certain period (not less than one week, because certain jobs may be done only once a week). From this analysis percentages are established for distribution of this expense.

Dept. 86-B. Production Control—Percentages are established, as above, from an analysis of time of schedulers and clerks.

(91) Power—Costs of operating Depts. 16-A. Steam, 16-B. Electric, 16-C. Air, and 16-D. Water, are distributed on this voucher. With the exception of 16-B. Electric, these costs are distributed on arbitrary percentages established by the Power Engineer. In establishing these percentages he takes into consideration the number, size, and the time used of outlets in each department. Dept. 16-B. Electric is distributed on connected horse power load in each department. This is taken from a list of motors which is kept by Dept. 10-B. Electrical Shop. It will not be necessary to change the connected load distribution every month, unless motors have been added to, or withdrawn from service. Before distributing Dept. 16-B. power, the cost of lighting is estimated and charged to Building Expenses.

(92) Development Expense—This voucher covers the following departments, which are distributed on basis shown.

Dept. 2-A.—Chief Chemist and Staff—A report is submitted to the Cost Department by the chief chemist, showing any specific tests made during the month. The actual cost of these tests are calculated, and charged specifically to the department for whom the test was made. The balance of the cost of operating this department is charged to Dept. 32 Mill Room, since this department is chiefly concerned with experimenting with, and testing mill batches.

Dept. 2-B.—Specification Dept.—The cost of operating this department is charged to Dept. 51-A. Tire Building, and Dept. 56-A. Tube Manufacturing, with a small percentage going to Dept. 91 Shipping Room, to cover shipping specifications. The manager of the Specifications supplies the Cost Department with the percentage to be charged against each product.

Dept. 26—Development and Technical Service—This is distributed on a basis of time spent for each department, as established by an analysis made by the Manager of Dept. 2-C.

Dept. 2-D.—Planning and Drafting—A record is kept of actual time spent on each job. This record is submitted to the Cost Department, who summarize it and make the charges to each department, according to the hourly rate as calculated by dividing the total operating cost by the total number of hours shown on the summary.

(93) Building Expense—Cost of operating Depts. 5-D. Elevators and Dept. 5-E. Watchmen are charged in total to Building Expense. Building Expense is distributed on a floor space basis.

(94) Administration—Administration expense is the cost of operating Dept. 1—Superintendent and Staff. This expense is distributed to other departments on a basis of the number of employees in each department.

(95) Personnel—Personnel expense includes the cost of operating Depts. 3—Factory Accounting, 5-B. Labor Office, 5C. Efficiency, 5-F. Police, and 5-G. Hospital. This is also distributed on a basis of the number of employees in each department.

(96) Materials Expense—This voucher covers Purchasing & Materials Exp.—Dept. 4, and Receiving Expenses—Dept. 20.

Dept. 4—Purchasing and Materials Expense is a charge to factory made by Head Office to cover the cost of operating the Purchasing Department, cost of invoicing passing section of General Accounting, and part of the

Traffic Department costs to cover incoming traffic. This expense is charged to the various storerooms on a basis of the value of goods received into each storeroom.

Dept. 20.—Receiving—covers the cost of operating the receiving room. A split is made of the receiver's time by the foreman in charge, and this is used as a basis for charging Receiving expense back to the various storerooms.

(97) Warehousing and Shipping—This covers the cost of operating Depts. 90-A. Tire Storage, 90-B. Tube Storage, and 91 Shipping Room. This expense is charged in total to Cost of Sales in Head Office Ledger.

All charges to Head Office are given to them on a journal sheet. When vouchers are completed the controls are posted to the voucher register. The voucher register is then added and the posting to the control accounts in the ledger is done.

ENGINEERING COSTS

As stated previously, a complete machine shop is maintained, which not only does all work of a repair or maintenance nature, but which makes much of the new equipment such as molds, tools, machine parts, etc.

All engineering costs are calculated on a job cost system. These costs are compiled by the Engineering Cost Section of the Factory Accounting Department.

When a department foreman requires some work done by the engineering department, he will issue a "K" order, which is a request to the engineering department to do the work. The engineering department will then issue a job order for the work. This job order will be given a number, and must show the department for whom the work is done, the "K" order number, the date issued, the complete detail of work to be done, and the estimated cost of the work. The job order card form must be sufficiently large for the engineering cost section to be able to accumulate all costs on it. Job orders are divided into three series:

(1) New Work Orders—To be used for additions to capital, and for making tools, machine parts, etc., which are charged to stores. This series will also be used for major maintenance jobs, where a specific cost is desired. In this series a separate order is issued for each job.

(2) Repair Orders—To be used for specific repair jobs, which are charged to departmental expense. A separate order is issued for each job.

(3) Standing Orders—To be used for maintenance jobs, which are constantly recurring, such as oiling of machinery, motor inspection, etc. These orders will be renewed at the beginning of each year.

The four elemements entering into engineering costs are material, labor, overhead and sales tax. The first three elements are controlled by the following accounts, in Miscellaneous Control in the factory ledged, Dept. 10 Material, Dept. 10 Labor, and Dept. 10 Overhead. Sales Tax is credited directly to Head Office, at the end of each month.

Material—All material requisitions charged to an engineering job number are charged by the Factory Accounting section to Dept. 10 Material, and are given to the Engineering Cost section, who post in detail, to the job cost cards.

Labor—At the end of each week the Labor Distribution department for-

ward to the Engineering Cost section, all labor sheets on which there appears labor to be charged to job orders. This labor is charged on labor distribution to Dept. 10 Labor. The Engineering Cost Section post this labor by job order number, on labor posting work sheets, in detail. Each week's labor is totalled, and is carried forward to the job order cost card.

Overhead—The cost of operating the Engineering Departments is estimated, and this cost is charged to Dept. 10 Overhead. This amount is then distributed to the job orders, as a percentage of direct labor. Any difference between estimated overhead and actual overhead will be absorbed in the estimated overhead for the following month, except at th end of the year, at which time extra care must be used in estimating, because the difference must be written off as an inventory adjustment. After the final postings are made to labor and material, they are totalled and carried forward to the Cost Summary section, on the job order card. The overhead and sales tax are then calculated, and the cost summary is then cross-totalled to secure the total charge for the month, and if a balance is open from a previous month, the month's balance is added to produce the accumulated cost to date.

New Work Orders are held open until the job is complete, therefore, these orders are sorted into completed orders and incompleted orders. Completed orders for additions to capital are posted to Voucher 80—Property Charges from New Work, and completed orders to stores items, etc., are posted to Voucher 82—New Work, other than property.

The cost appearing on Repair Orders and Standing orders is charged out each month to departmental expense accounts. The Totals of these orders are posted to Voucher 81 Maintenance. For statistical purposes all departmental expense charges for maintenance and repair work are charged on Voucher 81, according to account classification.

A report is made up at the end of each month, showing the budget number, the job order number, the amount spent to date, the estimated cost, and whether closed or not.

Variances:

Material and labor are charged to the factory at actual cost, and Finished Product is credited to the factory at Standard Cost, and so we have variances which must be cleared out of the factory ledger to Finished Stock. For this purpose we have an account in the Process ledger called "Finished Stock Variance." All variances, as they occur, are debited or credited to this account. Several variance accounts could be carried, but since there will usually be one entry setting up the variance, and one entry closing it to Finished Stock, it has been found that one account in the Factory Ledger is sufficient. At the end of each month this account is analyzed, and is allocated to products and cleared to Finished Stock on Voucher 8. As finished products are charged to Finished Stock at standard cost when the variances are applied back to individual products, the resultant cost will be actual. It has been found impossible to determine and distribute variances in time for the month-end closing, so that the variances are actually cleared to Finished Stock in the month following that in which they occur.

An explanation of the variance, and the method of distributing to products follows:

(1) Rubber Variance—When rubber is received, it is charged into stores at invoice weight and cost. When it is withdrawn from stores, it is charged

into process at actual weight and standard cost. Thus, we have a double variance, a cost variance, and a weight variance. When setting up standard cost of rubber, a percentage is added for invoice shrinkage. The difference by which this recovery exceeds or falls short of the actual weight difference, between invoice weight and actual weight, is known as the Shrinkage Variance. The difference between the invoice, or actual cost, and the standard cost, less invoice shrinkage allowance, is called the Purchasing Variance. These two variances actually appear as one figure on Voucher 20, and is the difference between the debit to process, and the credit to Stores. Rubber Variance is allocated to products on a basis of rubber content in the product. A breakdown is made of all sizes of tires and tubes, showing the various contents of one unit of each. These units multiplied by the month's production, gives us the contents for each size, which in turn is used for the variance distributions.

(2) **Fabric Variance**—As in the case of rubber, we have a shrinkage variance, and a purchasing variance. Fabric Variance is distributed on fabric content.

(3) **Pigment and Chemicals Variance**—Since most pigments and chemicals are purchased in drums, bags, or cartons, with specified weight or quantity in each, and are withdrawn from stores in the same manner, we do not have a weight variance, but only a purchasing variance. This is distributed on the pigment and chemical's content. Whenever a certain pigment or chemical is used only in one type of product, the total variance for that pigment or chemical is charged specifically to that product. This rule is followed throughout all our variance distributions.

(4) **Miscellaneous Material Variance**—As in the preceding variance this is a purchasing variance only. This variance is analyzed and split specifically. For example, variance on bead wire is charged or credited to tires, and is distributed on a bead wire content basis. Variance on tube valves is charged or credited to tubes, and is distributed on a production basis, since each tube takes one valve.

(5) **Labor Variance**—Labor variance is the difference between actual labor charged to process and the labor recovery, as shown by the various processing vouchers. Labor variance is divided into two classes, preparatory and process. Preparatory labor variances cover Depts. 31 Compound Mixing, Dept. 32 Mill Room, Dept. 33 Calender Room, Dept. 34-A. Cement Mixing, and Dept. 34-B. Stock Spreading and Dipping. With the exception of Dept. 33 Calender, these variances are distributed on Compound content. Dept. 33 Calender variance is distributed on combined Compound and Fabric Content. Process labor variances is further divided into two classes, those affecting tires and those affecting tubes. Those affecting tires are Dept. 41 Bias Cutters, Dept. 42 Bead Building, Dept. 43-A. Tread Tubing, 44 Airbag Manufacture, Depts. 51-A. B. & C. Tire Building, Curing, and Inspection. Those affecting tubes are depts. 43-B. Tube Tubing, Dept. 56-A. B. & C. Tube Manufacturing, Curing and Inspection. Process labor variances are distributed on a basis of labor recoveries as shown by Voucher 7.—Deliveries to Finished Stock.

(6) **Overhead Variances**—Overhead Variances, like labor variances, are divided into preparatory and process. Preparatory overhead variances are distributed along with preparatory labor variances, on weight of compound

content, and weight of compound and fabric content. Process overhead variance affecting tires are divided into the same classes as the expense recovery units, mold expense, development expense, airbag expense and regular expense. Mold expense variance is allocated to individual sizes. This can be done quite easily, because mold expense consists only of depreciation, which is set up by individual size and work by the machine shop, which also shows the size of the molds on the job orders. The recoveries on Voucher 2 Mold depreciation are calculated by individual sizes, so that it is a simple matter to arrive at the variance by size. Development expense is recovered on a basis of production, multiplied by the standard unit, so development expense variance can be split on production. Airbag expense variance is distributed on airbag expense recovery, as shown by Voucher 7 Deliveries to Finished Stock, and regular expense variance is distributed on regular expense recovery, as shown on this voucher, also the same method of distribution applies to variances affecting tubes, except that there is no airbag expense incurred in tube manufacturing.

(7) Construction Change Variance—As standard costs are changed only when there is a schedule change, or when there is a major construction change, there are a lot of changes made in specifications, which must be picked up as a variance. In order to be able to calculate this, extra columns have been added to the product cost sheets. Each month the specification changes are picked up in one of these additional columns, showing the date of the month when the change was put into effect. These changes are costed and analyzed each month, to get the total construction variance for each size. For example, the standard cost at the beginning of the period of a certain component may have been .10 cents, and on the fifteenth of the month a change was made, which raised the cost to .12 cents, the variance would be .02, multiplied by the production from the fifteenth of the month until the end of the month. The total of all these variances for the month will be the construction change variance. Many of these variances will be found too small to make an entry worth while, but all must be calculated, because a change of .01 on a high production tire might amount to more than a change of .10 on a small production tire.

(8) Weight Variance—Where a large number of components are used in making a product, it is almost impossible to make the product exactly to specification. This is particularly true, in the case of tires, where the amount of material used depends to a certain extent on the skill of the builder. Whenever possible, all tires coming off the production line should be weighed and the actual weights recorded. The difference between this weight and the specified weight, multiplied by the average per pound cost of the material used in the tire, will give us the weight variance. If it is not possible to weigh every tire, a representative number should be weighed, possibly one out of five, or one out of ten. If this is done, we must assume that the balance of the production will show the same weight variance as those weighed. This will not give us a very accurate figure.

(9) Calender Variance—In costing tires, certain components, such as plies, are costed at a standard cost per pound, for the component which is made up of fabric and compounds. In arriving at this cost, certain percentages are used, for example—fabric 30%, and compound 70%. All fabric treatments are calendered to a specified gauge, but it is impossible to apply the

exact specified amount of compound to the fabric, so we may end up with an actual weight used of 30.5% fabric, and 69.5% compound. Voucher 53 calendered Fabric Deliveries shows the actual weight of fabric and compound used in each treatment, and this voucher shows the cost of fabric, separate from the compound. By recosting these treatments, at the treatment cost, as used on the product cost sheets and having it extended, we can ascertain the variance between the two methods of costing. This Calender Variance is distributed back to tires, on a basis of fabric and compound content.

(10) Waste Variance—A record is kept showing the actual waste as compared to the waste recovery. Waste is divided into two classes, preparatory waste and defective product. Preparatory waste variance is distributed on a basis of weight of fabric and compound content. Defective product is distributed on a basis of production value.

Actual Costs:

After all variances have been distributed by sizes and types of product, actual costs can be calculated by applying these variances back to the components to which they belong. Actual costs are prepared for representative sizes (usually high production sizes) each month, and a comparison made with standard costs. This comparison is given to the management each month.

Editorial Note—Space does not permit the publication of the Chart of Accounts or to reproduce the accompanying forms. Cost and Management will gladly furnish information concerning these on request.

Back Issues of Cost and Management Wanted

The following back numbers of Cost and Management are urgently required:

September, 1929
December, 1929
October, 1934

Any member who can spare any of the issues listed is urged to mail same immediately to the Secretary.

« STUDENT SECTION »

COST ACCOUNTING

Comments by A. VAN HARRIS, C.A.

Problem

Laca Inc. operates three producing departments known as Forging, Grinding and Finishing. All products pass in turn through all three departments.

At the commencement of business on April 1st, there were on hand inventories of work-in-process as follows, estimated to be one-half completed in their present departments:—

Forging Dept		
Grinding Dept.—1,600 units		
Forging Dept. cost 1,600 @ $3.52½	5,640	
Grinding Dept. cost 1,600 @ ½ of $1.50	1,200	6,840
Finishing Dept.—1,000 units		
Forging Dept. cost 1,000 @ $3.60	3,600	
Grinding Dept. cost 1,000 @ $1.50	1,500	
Finishing Dept. cost 1,000 @ ½ of 200	1,000	6,100
		12,940

Charges for the month of April were as follows:—

	Forging	Grinding	Finishing
Material	$11,000	$	$ 3,080
Wages	18,400	6,540	6,000
Direct Expenses	2,100	3,000	4,000
Apportioned Charges	4,200	3,300	5,200
	$35,700	$12,840	$18,280

The above charges included the costs of completing the work which was in process on April 1st. The cost to complete this work-in-process in the respective departments was in accordance with the estimates for that department included in colculating the inventory on April 1st.

The production record of the various department for the month of April was as follows:

	Forging	Grinding	Finishing
Units in process at beginning of month — all completed in April and transferred to Transferred Goods		1,600 units	1,000 units
Units received in Dept. during month	11,000 units	10,000 units	11,000 units

Units in process at end of month, all started in production during April ..... 1,000 units 600 units 3,000 units

The unfinished work on each department at the end of April was estimated to be one-half completed in that department. In the Forging and Finished departments material was used at the beginning of the process.

Prepare a schedule to show:

1. The cost in each department of each unit received in that department during the month of April.

2. The cost per unit for the month of April at the end of each department's production.

3. The value of the inventories of work-in-process as at April 30th.

Solution

LACA INC. PROCESS COST SHEET—APRIL 19

	Forging	Grinding	Finishing
Material	11,000		3,080
Wages	18,400	6,540	6,000
Direct Expenses	2,100	3,000	4,000
Apportioned Charges	4,200	3,300	5,200
Total Charges in Dept. for month	35,700	12,840	18,280
Add opening Inventories April 1st		6,840	6,100
	35,700	19,680	24,380
Cost from previous Department (see below)		33,525	50,829
	35,700	53,205	75,209

PRODUCTION SCHEDULE

	Forging	Grinding	Finishing
Opening Inventory		1,600	1,000
Units started in Process	11,000	10,000	11,000
Work-in-Process at end	1,000	600	3,000
Units to next dept.	10,000	11,000	9,000

DIVISION OF COSTS

	Forging	Grinding	Finishing
Total Costs as above	35,700	53,205	75,209
Less Closing Inventory (see below)	2,175	2,376	16,830
Value of Work Transferred	33,525	50,829	58,379

PRODUCTION IN TERMS OF FINISHED PRODUCT

Forging—

10,000 units finished

1,000 units ½ finished—Total 10,500 finished units transferred

Grinding—

1,600 units ½ finished
9,400 units finished
600 units ½ finished—Total 10,500 finished units transferred

Finishing—

1,000 units ½ finished
8,000 units finished
3,000 units ½ finished—Total 10,000 finished units transferred

DEPARTMENTAL COSTS

Forging—		
Materials $11,000÷11,000=	$1.00	
Other costs 24,700÷10,500=	2.35	approx.
	$3.35	approx.
Grinding—		
Total Costs $12,840÷10,500=	$1.22	approx.
Finishing—		
Materials $3,080÷11,000=	$ .28	
Other Costs 15,200÷10,000=	1.52	
	$1.80	

INVENTORIES

Material 1,000 units @ 1.00	1,000	
Other Costs 500 units @ 2.35	1,175	$ 2,175
Forging—1000 units		
Grinding—600 units		
Previous 600 units @ 3.35	2,010	
Other Costs 300 units @ 1.22	366	2,376
Finishing—3000 units		
Previous 3000 units @ 4.57 (3.35+1.22)=		
(or at $4.62 see below)	13,710	
3000 units @ .28	840	
1500 units @ 1.52	2,280	16,830
		$21,381

Comments

Problems on process costs, such as this which include both opening and closing inventories should not be assumed by the student to be too simple. The original problem from which this was modelled was not involved. It assumed that unfinished inventories of work-in-process were 50% completed in respect to both material and other costs. With the alteration whereby materials are added at the commencement of the process, the costing of the unfinished inventories must be calculated separately for the different elements of cost.

Depending on the established procedure of the company, the inventories of unfinished work might be calculated as outlined in this solution or

alternatively the cost of units brought forward from the previous department might be costed on the average for the department—for example:

$$\text{Forging Dept.} \quad \frac{\text{Value of Work Transferred}}{\text{Units completed and Transferred}} = \frac{\$33{,}525}{10{,}000} = \$3.35 \text{ approx.}$$

$$\text{Grinding Dept.} \quad \frac{\text{Value of Work Transferred}}{\text{Units completed and Transferred}} = \frac{\$50{,}829}{11{,}000} = \$4.62 \text{ approx.}$$

$$\text{Finishing Dept.} \quad \frac{\text{Value of Work Transferred}}{\text{Units completed and Transferred}} = \frac{\$58{,}379}{9{,}000} = \$6.486 \text{ approx.}$$

Comparing these costs with the departmental unit costs, based on production—Forging costs are the same, Grinding costs (cumulative) compare $4.57 with $4.62, and Finishing costs $6.37 with $6.486. Obviously the reason for the apparent discrepancies is the fact that opening inventories were priced at figures which differed from the prices applicable to the current production. While the differences are explainable, they are definitely disconcerting and, of course, provide opportunity for slightly different arithmetic solutions, which are all equally satisfactory.

GENERAL ACCOUNTING

Comments by H. P. WRIGHT, C.G.A., R.I.A.

ACCOUNTING II

Problem

(a) How does a consolidated balance sheet of a holding company differ from a balance sheet drawn off the general ledger of the holding company?

(b) What are "minority interests"? How is their amount calculated? How do they appear in the consolidated balance sheet?

(c) Explain the treatment, in the consolidated balance sheet, of a discrepancy between the price paid for shares in a subsidiary and the Book worth of these shares.

Solution

(a) In the consolidated balance sheet the actual assets and liabilities of subsidiary company are substituted for the item "Investment in subsidiary" which appears on the general ledger of the holding company.

(b) "Minority interests" are the interests in the capital and surplus of the subsidiary which are owned by outside shareholders i.e. shareholders who have not sold their shares to the holding company.
The amount of minority interests is computed by multiplying the net worth of the subsidiary (as shown by its books) by a fraction whose numerator is the number of shares owned by outsiders and whose denominator is the total number of shares outstanding.
"Minority interests" appear in the consolidated balance sheet as liabilities. They are not a part of the capital and surplus.

(c) This discrepancy is brought on to the consolidated balance sheet as a balancing item.

Comments

This is not a practical accounting problem but rather a means of testing the general accounting knowledge of the student.

There are no facts given. The information required must be provided from the course notes, text and lectures or lessons. Practical experience is also of material assistance in supplying the required information. These three sections service to test the ability to do these things.

While examples might be used to amplify the answer if time permitted, they are not requested. It would be sufficient to reply in this case much like one might state in a manual instruction. Tell the difference asked for in a few words in such form that anyone following the advice would be able to perform what was stated in the desired form.

In the second section of this problem, it is sufficient to give a statement of the required information sufficiently clear so that you have given evidence in the fact that you know what the handling of such a situation demands.

The third section will be covered if the procedure in bringing the condition onto the balance sheet, in such form, that it may be readily understood and in standard form, is given in the answer.

This knowledge is required in statement preparation.